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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

MAY 17 1991

91-WOB-172

Mr. Timothy L. Nord
Hanford Project Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504

Dear Mr. Nord:

RESPONSE TO MAY 3, 1991, LETTER, "LERF POND LINER, LETTER OF APRIL 30, 1991, CERTIFICATION"

Reference: Letter, S. H. Wisness, U. S. Department of Energy-Richland Operations Office to T. L. Nord, Washington Department of Ecology, Response to April 30, 1991, letter, "LERF Pond Liner, Test Pad No. 6, "dated May 3, 1991.

The subject letter again raises the question of "certification." At the technical meeting held in Richland, Washington, attended by your representatives, they accepted the "certification" as answered in the reference letter (repeated below):

> "The April 10 and 18 letters from Chen-Northern Inc., were discussed in relation to certifying that the dikes will not fail due to scouring or piping. It was agreed by Ecology (Gary Anderson) that both of these Professional Engineer (PE) stamped letters are acceptable and complete documentation that "the dikes will not fail due to scouring or piping" as required by WAC 173-303-650. It was also agreed that the Professional Engineer's opinion as indicated by the stamping of the aforementioned letters is acceptable and is consistent with the EPA permitting requirements for land disposal facilities cited in the Federal Register July 26, 1982, and as stated in RCW 18.43.070, Certificates and Seals, 1989 (both quoted below):
>
> o Federal Register July 26, 1982 - 'The terms "certification," "certify," and "certified" are used throughout the regulations,' including those promulgated today, to refer to the rendering of a professional opinion concerning compliance with a requirement of the regulations by a qualified professional in the field. Commenters have suggested that courts sometimes interpret these terms to imply that certification is equivalent to a guarantee or warranty, thus relieving other parties (e.g., owners and operators) of their responsibilities under regulations as a result of such certifications. This was not intended by the Agency in the various RCRA certification requirements. By requiring a certification, the Agency is seeking the opinion from a

professional qualified in the field but does not intend to relieve owners and operators from their responsibilities under the regulations. The definition does not address the potential liabilities of the certifying party. This a matter to be resolved between the certifying party and the owner or operator in accordance with applicable law. Since EPA still believes the terms "certification" and "certify" accurately denote the Agency's intention, EPA is choosing to define the terms to eliminate possible legal misinterpretation.'

- RCW 18.43.070, Certificates and Seals, 1989 - 'Each registrant hereunder shall upon registration obtain a seal of the design authorized by the board, bearing the registrant's name and the legend "registered professional engineer" or "registered professional land surveyor". Plans, specifications plats and reports prepared by the registrant shall be signed, dated and stamped with said seal or facsimile thereof. Such signature and stamping shall constitute a certification (underline emphasis added) by the registrant that the same was prepared by or under his direct supervision and that to his knowledge and belief the same was prepared in accordance the requirements of statute.'

The recorder's note from the May 1, 1991 technical meeting, indicates that Mr. Anderson stated, "in the morning (5-2-91) I'll grab Toby Michelena and tell him the results of this meeting and tell him that my objections to the moisture content spread are satisfied and I can accept the certification because it is indeed a valid certification (underline added) and I can recommend that we proceed with lining the ponds."

To expeditiously receive construction authorization, the attached "Certification of Qualified Engineer" was prepared and provided to you in Richland, Washington, on May 5, 1991. With attainment of your signature, construction of the LERF basins commenced on May 6, 1991.

It is felt that the "Certification of Qualified Engineer" was not required since the Revised Code of Washington defines the stamp and signature of a registered professional engineer as meaning "certification". I wish to point out that the preparation of the "Certification of Qualified Engineer" was done to minimize continued delay in starting construction of the LERF basins, since any additional delay would have cost greater than $11,000 per day.

A protocol must be established to identify Ecology's role in Hanford's construction activities. Though we welcome your participation, we must ensure that DOE retains the role of project/program manager. Ecology needs to be provided access and review of activities/documents while maintaining the stance of an independent regulatory. Please let me know when a special meeting to clarify our working protocol can be arranged.

Questions on this should be directed to Ms. T. M. Hennig on (509) 376-6888.

Sincerely,

Steven H. Wisness
Hanford Project Manager

Attachment

cc w/att
P. Stasch, Ecology
G. Anderson, Ecology
T. Michelena, Ecology
T. B. Veneziano, WHC
D. E. Kelley, WHC

KAISER ENGINEERS HANFORD

KAISER ENGINEERS HANFORD COMPANY
POST OFFICE BOX 888
RICHLAND, WASHINGTON 99352

REG. NO KAISEEH134BM

CERTIFICATION OF QUALIFIED ENGINEER

In accordance with WAC 173-303-650(4)(c)(i) and (ii), I, Edgar A. Goakey, P.E. certify that the dike portion of the W-105 Project has structural integrity. Specifically:

(i) The dike will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the impoundment; and

(ii) The dike will not fail due to scouring or piping, without dependence on any liner[1] system included in the surface impoundment.

This certification is based upon the independent analysis of the structural integrity of the dike as set forth in the KEH memorandum dated March 29, 1991, attached as exhibit 1 and letters from Chen Northern, Inc. dated April 18, 1991 and April 10, 1991 attached as exhibit 2.

DATED THIS 5th day of May, 1991

Kaiser Engineers Hanford, Co.

Edgar A. Goakey
Edgar A. Goakey,
Professional Engineer

CERTIFICATION ACCEPTED BY

Teresa M Hennig 5/5/91
T. M. Hennig
U. S. Dept of Energy

5/5/91
R. J. Julian
Westinghouse Hanford Co.

T. L. Nord
State of Washington
Department of Ecology

EDGAR A. GOAKEY
STATE OF WASHINGTON
9813
REGISTERED
PROFESSIONAL ENGINEER

Edgar A. Goakey 5/5/91

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[1] The soil/bentonite liner is considered a tertiary liner installed as a part of the dike structure and is in addition to the two flexible membranes (HDPE) and leachate collection system as specified in WAC 173-303 et seq.

ATTACHMENT 1 to 0-

Enclosure

yes

KAISER ENGINEERS HANFORD

INTEROFFICE MEMORANDUM

TO S. L. Peterson

DATE March 29, 1991

FROM E. A. Goakey

COPIES TO

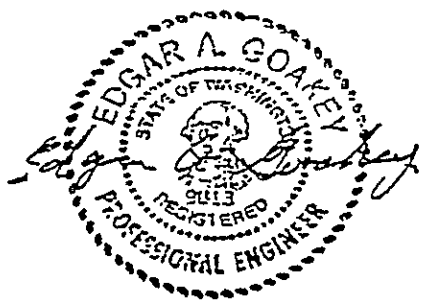
JOB NO. N/A

SUBJECT RESPONSE TO LETTER OF INSTRUCTION #55, ISSUE 11 AND 16

Please accept this letter as certification that the dike portion of the basins has been designed for structural integrity to prevent failure without dependence on any liner system included in the surface impoundment construction. The dike will withstand the stress of the pressure exerted by the types and amounts of wastes in the impoundment. The dike has a safety factor greater than 3 against failure by sliding and the top of sides are stabilized with a 3 inch layer of crushed gravel to prevent water and wind erosion of the surfaces.

Calculations are attached.

EAG:sme
Attachments



3/29/91

April 18, 1991

Kaiser Engineers Hanford Company
P.O. Box 888
Richland, Washington 99352

ATTENTION: Mr. Steve Peterson

SUBJECT: Additional Information for Project W-105
Part B Permit Application
Compliance with Washington Annotated Codes,
(WAC) 173-303-650

Gentlemen:

In accordance with your request of April 17, 1991, we have reviewed previously transmitted information and have prepared additional information regarding compliance of the W-105 geotechnical design with WAC 173-303-650. The new information includes:

- Scour and piping potential for the soil-bentonite liner.

We have reviewed the following information previously transmitted to Kaiser Engineers Hanford Company (KEH):

- Soil-Bentonite Liner Permeability (Chen-Northern letter of March 11, 1991 to KEH).

- Shear strength, dike stability, settlement, subsidence, and uplift stresses on the gravel dikes and soil-bentonite liner (Chen-Northern letter of March 26, 1991 to KEH). In these analyses, each basin liner was assumed to consist of two High Density Polyethylene liners and a tertiary soil-bentonite system. The soil-bentonite liner was considered to be part of the dikes in regard to structural integrity.

- Piping and scour potential of the gravel dikes (Chen-Northern letter of April 10, 1991 to KEH).

The results of our review and recent analysis indicates that:

1. The W-105 dikes, including the gravel basins and soil-bentonite liner, are expected to withstand the hydraulic pressures exerted by the liquid waste in the impoundment.

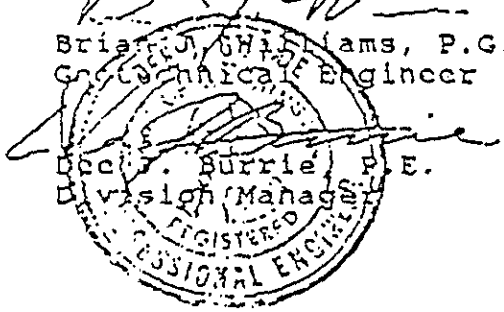
2. The geotechnical design of the W-105 project, including the factors listed above, complies with the requirements set forth in WAC 173-303-650.

If you have any questions regarding this letter, or if we can be of further service, please contact us.

Respectfully Submitted,
CHEN-NORTHERN, INC.

Brian J. Williams, P.G.
Geotechnical Engineer

Dec J. Burrie, P.E.
Division Manager



PIPING AND SCOUR

Piping through a soil-bentonite liner may occur when the liner is penetrated by some conduit (hole or leakage path), and water is allowed to pass unimpeded through the conduit. In the design of the W-105 soil-bentonite liner, a non-woven geotextile (Polyfelt TS 750 ®) was specified for placement between the gravel dike materials and the soil-bentonite liner. Our analysis indicates that the geotextile will perform as an effective retention barrier, thus minimizing the potential for soil-bentonite liner piping.

Scour of a soil-bentonite liner is a function of flow type and velocity of flow adjacent to the soil-bentonite liner. Under normal operating conditions of hydrostatic pressure, a pinhole-type or seam-type leak is the normal mode of leakage. This type of leakage is typically low velocity and low volume. In this case, scour is not expected to occur. Scour of the soil-bentonite liner is only expected to occur under conditions of high velocity turbulent flow, such as a hose directed at unprotected section of the soil-bentonite, or a large-scale pipe failure leaking high-pressure fluid directly onto the soil liner. Since no piping penetrates the soil-bentonite liner, this situation is not expected to occur.

Chen-Northern, Inc.

April 10, 1991

Kaiser Engineers Hanford Company
P.O. Box 888
Richland, Washington 99352

ATTENTION: Mr. Steve Peterson

SUBJECT: Additional Information
W-105 Part B Permit Application

Gentlemen:

In accordance with your request of April 9, 1991, we have reviewed the potential for scour and piping in the gravel dikes of the W-105 project.

Our analysis indicates that, under all liner leakage conditions (excluding total loss of the liner), piping or scour are not expected to impact the stability of the gravel dikes.

If you have any questions regarding this letter, or if we can be of further service, please call us.

Respectfully Submitted,
CHEN-NORTHERN, INC.

Brian J. Williams

Brian J. Williams, P.G.
Geotechnical Engineer

Dee J. Burrie, P.E.
Division Manager

PIPING AND SCOUR

Piping is a progressive erosion and transport mechanism which may occur when seepage forces through a water-retaining embankment cause erosion at the downstream face of the embankment. The erosion progresses upgradient from the face of the embankment and eventually encounters the impounded fluid, precipitating a massive loss of fluid. The primary factors controlling piping are embankment grain size and the exit velocity of seepage water through the embankment.

Scour is an open-surface erosion mechanism which may occur when free-field water velocities are of sufficient velocity to erode and transport particles, in accordance with Stokes law. The primary factors controlling scour are water velocity and grain size.

The basic assumption behind potential piping or scour is that a phreatic surface has formed through or below the water-retaining embankment, and that the seepage forces along, inside, or downstream (outside) of the embankment are sufficient to erode the embankment soils.

At the W-105 project, under all conditions except complete loss of the liner, no phreatic surface is expected to develop through the embankment which exits outside (downstream) of the embankment. The reasons for this include:

- Groundwater at the project site is more than 150 feet below the ground surface.
- The in-place permeability of the native soils is relatively high, ranging from about 5.5x10-4 centimeters per second to 1 centimeter per second (Chen-Northern, 1990).

Considering the relatively deep groundwater and relatively high rate of subsurface permeability, pond leakage (through the liner system) will tend to migrate vertically downward. In the case of this vertical flow, the basic mechanisms precipitating scour and piping cannot occur, and therefore neither piping or scour is expected to impact the stability of the gravel dikes at the W-105 project.

RREFERENCES

Chen-Northerrn, Inc., 1990, "Report of Geotechncial Investigation, W-105 242-A Evaporation and Purex Interim Rentention Basins", Report for Kaiser Engineers Hanford Company.

DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
SH Wisness/DOE-RL	TL Nord/Ecology	Incoming: 9102434

Subject Response to May 3, 1991, "LERF Pond Liner, Letter of April 30, 1991, Certification"

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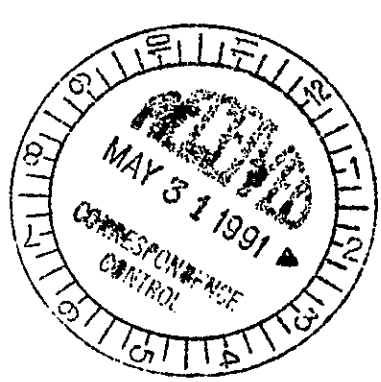

Distribution Corrections: Marian Cram - 6-4123 - A3-01 or cc:Mail

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